10/17/16

"The will to succeed is important, but what's more important is the will to prepare."-Bobby Knight

HW: Review Sheet for Q1T2
Test 2 on Wednesday

MIT Topic

AIM: How do we Simplify $\boxed{\text{Rational Expressions?}}$

Warm Up:

1) What does "Undefined" mean?

When the denominator is 0, except $\frac{0}{0}$

(indeterminant)

2) What does it mean to "simplify"?

Perform any operations;
reduce all fractions.

When we see rational expressions we should immediately factor what we can!

(fraction)

Once the denominator is factored we can identify any restrictions. We write the restrictions to avoid undefined fractions.

When everything is factored we can "cancel" any common factors of the numerator and the denominator.

You can only cancel factors, not terms!

$$\frac{\cancel{x}+3}{\cancel{x}}$$ No!

undefined

Find the value(s) of the variable for which each rational expression is not defined.

(a) $\dfrac{x^2-49}{2x^2-4x}$

$2x^2-4x\neq 0$

$2x(x-2)\neq 0$

$2x\neq 0$ | $x-2\neq 0$

$x\neq 0$ | $x\neq 2$

$\boxed{\text{restrictions } x\neq 0, 2}$

(b) $\dfrac{5}{c^2-25}$

$c^2-25\neq 0$

$(c+5)(c-5)\neq 0$

$c\neq -5$ | $c\neq 5$

restrictions $c\neq \pm 5$

(c) $\dfrac{x-3}{x^2+9}$

$x^2+9\neq 0$

$\quad -9 \quad -9$

$\sqrt{x^2}\neq\sqrt{-9}$

$x\neq\pm 3i$

imaginary therefore no restrictions

(d) $\dfrac{6}{3x^2-8x+4}$

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$-2 \mid -6$

$3x^2-8x+4\neq 0$

$3x^2-6x-2x+4\neq 0$

$3x(x-2)-2(x-2)\neq 0$

$(x-2)(3x-2)\neq 0$

$x\neq 2$ | $3x-2\neq 0$

$3x\neq 2$

$x\neq \frac{2}{3}$

2) Simplify

$$\frac{x^2}{x^2+3x} = \frac{\cancel{x^2}\, x}{\cancel{x}(x+3)} = \boxed{\frac{x}{x+3}}$$

rest: $x \neq 0, -3$

$x(x+3) \neq 0$

$x \neq 0 \mid x \neq -3$

✱ Identify restrictions before simplifying.

3)

$$\frac{x^2+2x-3}{x^2-1} = \frac{(x+3)\cancel{(x-1)}}{(x+1)\cancel{(x-1)}} = \boxed{\frac{x+3}{x+1}}$$

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DOTS

rest: $x \neq \pm 1$

restrictions:

$(x+1)(x-1) \neq 0$

$x \neq -1 \mid x \neq 1$